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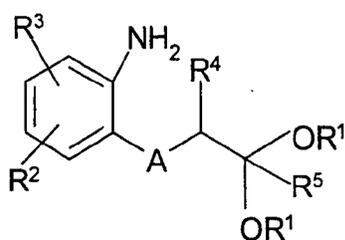
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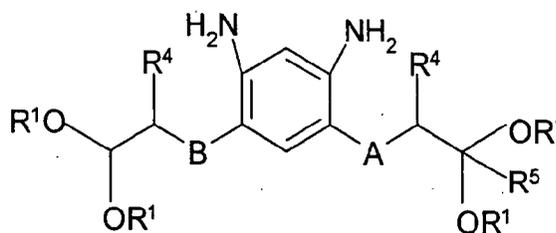
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(54) **Hair dye composition**

(57) Provided is a hair dye composition comprising a compound (1) or (2) or a salt thereof:



(1)



(2)

wherein each of A and B represents sulfur or oxygen atom; R¹ represents a C₁₋₆ alkyl group; each of R² and R³ represents a hydrogen atom, a C₁₋₆ alkyl, a C₁₋₆ acyl, a C₁₋₆ alkoxy, a hydroxy, an amino, a nitro, a C₂₋₇ alkoxy carbonyl, a carboxy or a carboxylate anion group; R⁴ represents a hydrogen atom, a hydroxy or a C₁₋₆ alkoxy group; R⁵ represents a hydrogen atom, a C₂₋₇ alkoxy carbonyl or a phenyl group.

This hair dye composition has excellent hair-dyeing ability, can impart the hair with a vivid and/or natural-looking color ranging from yellow to red, and has good fastness to shampooing.

BEST MODE FOR CARRYING OUT THE INVENTION

[0008] In the hair dye composition according to the present invention, compound (1) and/or (2) must be used for providing both (A)excellent hair-dyeing ability and good fastness to shampooing, and (B)vivid and/or suitable natural-looking hair color ranging from yellow to red simultaneously. That is to say, when the compound (1) or (2) is used as precursor of pseudo-trichochromes, pseudo-phaeomelanins or like pigments, the hair-dyeing ability and fastness to shampooing of the resulting hair dye composition is improved by leaps and bounds compared with the case where the precursors of (pseudo-)trichochromes, (pseudo-)phaeomelanins or like pigments mentioned in Japanese Laid-Open Publication Nos. Hei 7-252118, 7-252120 or 7-252121 are used. Moreover, when the compound (1) or (2) is used, hair color is vivid and/or hair color looks much more natural compared with the case when oxidative dye intermediates are used.

[0009] The definitions for R¹, R², R³, R⁴ and R⁵ in formulas (1) and (2) above are explained as follows in more detail.

[0010] Examples of the C₁₋₆ alkyl groups include methyl, ethyl, propyl, butyl, pentyl, hexyl, 1-methylethyl, 1-methylpropyl, 2-methylpropyl and 1,1-dimethylpropyl groups. Among them, methyl and ethyl are preferred. Examples of the substituents for the alkyl group include one or a few hydroxy group(s), one or a few carboxy group(s), one or a few C₂₋₇ alkoxy carbonyl group(s), one or a few carboxylate anion group(s) having ammonium or alkali metal cation as counter ion, one or a few C₁₋₆ alkoxy group(s) and/or one or a few amino group(s) as substituent(s). The alkyl group may have two or more than two kinds of substituents at the same time.

[0011] Examples of the alkyl groups having one or a few hydroxy group(s) include hydroxymethyl, 2-hydroxyethyl, 1-hydroxyethyl, 3-hydroxypropyl, 1,2-dihydroxyethyl and 1,2,3-trihydroxypropyl groups. Among them, 2-hydroxyethyl, 1-hydroxyethyl and 3-hydroxypropyl are preferred. Examples of the alkyl groups having one or a few carboxy group(s) include 1-carboxymethyl, 2-carboxylethyl, 1-carboxylethyl and 1,2-dicarboxylethyl groups. Examples of the alkyl groups having one or a few alkoxy carbonyl group(s) include 1-methoxycarbonylmethyl, 1-ethoxycarbonylmethyl, 2-methoxycarbonylethyl, 2-ethoxycarbonylethyl and 1,2-di(ethoxycarbonyl)ethyl groups. Examples of the alkyl groups having one or a few carboxylate anion group(s) having alkali metal cation as counter ion include 1-(sodium carboxylate) methyl, 2-(potassium carboxylate)ethyl and 1,2-di(potassium carboxylate)ethyl groups. Examples of the alkyl groups having one or a few C₁₋₆ alkoxy group include 1,1-diethoxymethyl, 1,1-diethoxyethyl, 1,2-dimethoxyethyl and 2-ethoxyethyl groups. Examples of the alkyl groups having one or a few amino group(s) include aminomethyl, 2-aminoethyl, 1-aminoethyl, 3-aminopropyl, 1,2-diaminoethyl and 1,2,3-triaminopropyl groups. Among them, 2-aminoethyl, 1-aminoethyl and 3-aminopropyl are preferred. Examples of the alkyl groups having two or more than two kinds of substituents at the same time include 2-amino-2-ethoxycarbonylethyl and 2-amino-2-(potassium carboxylate)ethyl groups.

[0012] Examples of the C₁₋₆ acyl groups include formyl, acetyl, propionyl, butyryl, pentanoyl, hexanoyl and 2-methylpropionyl groups. Among them, formyl and acetyl are preferred.

[0013] Examples of the C₁₋₆ alkoxy groups include methoxy, ethoxy, propoxy, butoxy, pentyloxy, hexyloxy, 1-methylethoxy and 1,1-dimethylethoxy groups. Among them, methoxy and ethoxy are preferred.

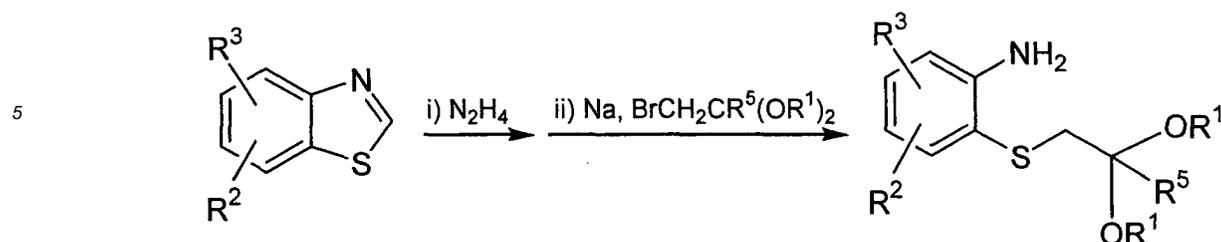
[0014] Examples of the C₂₋₇ alkoxy carbonyl groups include methoxycarbonyl, ethoxycarbonyl, propoxycarbonyl, butoxycarbonyl, pentyloxycarbonyl, hexyloxycarbonyl and 1,1-dimethylethoxycarbonyl groups. Among them, methoxy and ethoxy are preferred.

[0015] Examples of the carboxylate anion groups having ammonium or alkali metal cation as counter ion include ammonium carboxylate, lithium carboxylate, sodium carboxylate and potassium carboxylate. Among them, sodium carboxylate and potassium carboxylate are preferred.

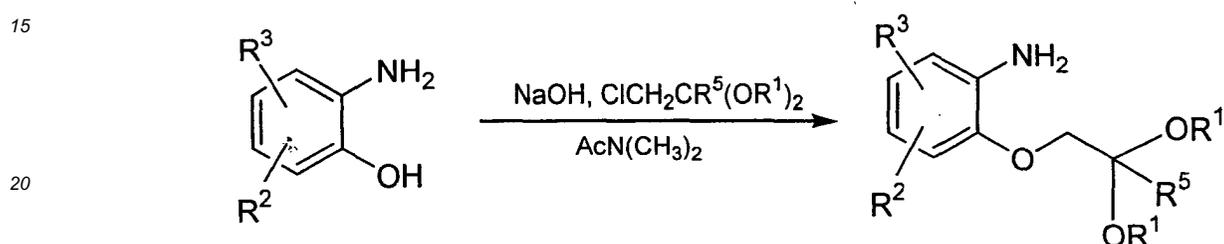
[0016] Examples of the amino groups having one or two alkyl group(s) include methylamino, dimethylamino, ethylamino and diethylamino group.

[0017] Examples of the substituents which may substitute on phenyl group include C₁₋₄ alkyl group, C₁₋₆ alkoxy group, hydroxy group, amino group, fluorine atom, chlorine atom, bromine atom and iodine atom.

[0018] Examples of 1-(o-aminophenylthio)-2,2-dialkoxyalkane derivatives or 1-(o-aminophenoxy)-2,2-dialkoxyalkane derivatives represented by formulas (1) or (2) include following structures.



[0022] The 1-(o-aminophenoxy)-2,2-dialkoxyalkane derivative represented by formula(1) may be prepared in accordance with the following reaction scheme:

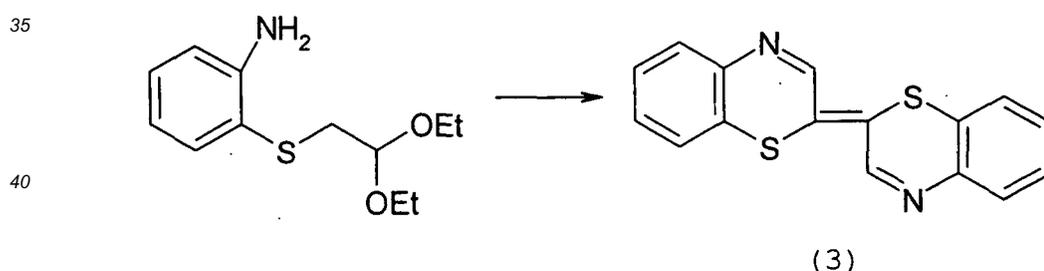


[0023] The hair dye composition of the present invention may be applied to the hair in such a manner that sufficient oxidation takes place, in the hair to provide a tinctorially effective amount of hair dyeing "pseudo-trichochromes", "pseudo-phaeomelanins" or like pigments to permanently dye the hair.

[0024] Trichochromes are polycyclic pigments generally characterized as yellow or red. Several of them are known and have been extracted from red hair and feathers under alkaline conditions.

[0025] Phaeomelanins are reddish-brown nitrogen and sulfur containing macromolecular pigments which are found in phaeomelanocytes. They are derived from tyrosinase oxidation of tyrosine and subsequent reaction with cysteine.

[0026] It is known that 1-(o-aminophenylthio)-2,2-dialkoxyalkane derivative could be oxidized to form the following conjugated dimer (3) :



45 as disclosed, for example, in the literature: Tetrahedron, 32, 1407(1976). The conjugated dimer has a partial structure of trichochromes, so the present inventors call these conjugated dimers as "pseudo-trichochrome".

[0027] "Pseudo-trichochrome", "pseudo-phaeomelanin" and like compounds are the end-product pigments of this invention which provide natural looking color. It is believed that these terms and their meanings are well understood by the skilled artisan even though the exact chemical identity of some of the products is not precisely known or understood.

[0028] Moreover, compounds (1) or (2) or salts thereof may be used as a coupler of oxidative hair dye when it is incorporated with oxidative dye precursor(s) or as a precursor of oxidative dye when it is incorporated with oxidative dye various couplers. In these cases, too, the end products may be pigments, which provide natural-looking color.

55 [0029] The hair dye composition of the present invention may be (auto)oxidized by oxygen in the atmosphere, or may be oxidized by adding a chemical oxidizing agent. In the former case, oxidation may be achieved by leaving the hair in air for an appropriate time after applying the composition of the present invention and subsequent treatment of the hair by the composition having pH value of 0.5 to 4. In the latter case, oxidation may be achieved by applying the composition which comprises both the compound (1) or (2) and the chemical oxidizing agent, or by applying the com-

position which comprises the chemical oxidizing agent after applying the composition which comprises the compound (1) or (2).

[0030] Examples of particularly preferable oxidizing agents include hydrogen peroxide, persulfate, perborate, percarbonate, products obtained by adding hydrogen peroxide to urea or melamine, bromate, ferricyanide, periodate and iodate. Persulfate, perborate, percarbonate, bromate, ferricyanide, periodate and iodate include ammonium salt and salts of alkali metals, preferred sodium and potassium.

[0031] These oxidizing agents may be used either singly or in any combination thereof and are preferably incorporated in a proportion of 0.01 to 50 wt.%, more preferably 0.1 to 25 wt.% based on the whole composition.

[0032] The hair dye composition of the present invention may comprise one or more than one oxidative dye intermediate(s), one or more than one direct dye(s) and/or one or more than one autooxidative dye precursor(s) so as to change the color.

[0033] Known precursor and/or coupler, which is generally used in oxidative hair color, may be used as oxidative dye intermediate.

[0034] Examples of precursors include p-phenylenediamine, toluene-2,5-diamine, 2-chloro-p-phenylenediamine, N-methoxyethyl-p-phenylenediamine, N,N-bis(2-hydroxyethyl)-p-phenylenediamine, 2-(2-hydroxyethyl)-p-phenylenediamine, 2,6-dimethyl-p-phenylenediamine, 4,4'-diaminodiphenylamine, 1,3-bis(N-(2-hydroxyethyl)-N-(4-aminophenyl)amino)-2-propanol, PEG-3,3,2'-p-phenylenediamine, p-aminophenol, p-methylaminophenol, 4-amino-3-methylphenol, 2-methylamino-4-aminophenol, 2-(2-hydroxymethylaminomethyl)-4-aminophenol, o-aminophenol, 2-amino-5-methylphenol, 2-amino-6-methylphenol, 2-amino-5-acetamidophenol, 3,4-diaminobenzoic acid, 5-aminosalicylic acid, 2,4,5,6-tetraaminopyrimidine, 2,5,6-triamino-4-hydroxypyrimidine, 4,5-diamino-1-(4-chlorobenzyl)pyrazol, 4,5-diamino-1-hydroxyethylprazole and their salts.

[0035] Examples of couplers include m-phenylenediamine, 2,4-diaminophenoxyethanol, 2-amino-4-(2-hydroxyethylamino)anisole, 2,4-diamino-5-methylphenol, 2,4-diamino-5-(2-hydroxyethoxy)toluene, 2,4-dimethoxy-1,3-diaminobenzene, 2,6-bis(2-hydroxyethylamino)toluene, 2,4-diamino-5-fluorotoluene, 1,3-bis(2,4-diaminophenoxy)propane, m-aminophenol, 5-amino-2-methylphenol, 5-(2-hydroxyethylamino)-2-methylphenol, 2,4-dichloro-3-aminophenol, 2-chloro-3-amino-6-methylphenol, 2-methyl-4-chloro-5-aminophenol, N-cyclopentyl-m-aminophenol, 2-methyl-4-methoxy-5-(2-hydroxyethyl)aminophenol, 2-methyl-4-fluoro-5-aminophenol, resorcinol, 2-methylresorcinol, 4-chlororesorcinol, 1-naphthol, 1,5-dihydroxynaphthalene, 1,7-dihydroxynaphthalene, 2,7-dihydroxynaphthalene, 2-(1-methylethyl)-5-methylphenol, 4-hydroxyindole, 5-hydroxyindole, 6-hydroxyindole, 7-hydroxyindole, 6-hydroxybenzomorpholine, 3,4-methylenedioxyphenol, 2-bromo-4,5-methylenedioxyphenol, 3,4-methylenedioxyaniline, 1-(2-hydroxyethyl)amino-3,4-methylenedioxybenzene, 2,6-dihydroxy-3,4-dimethylpyridine, 2,6-dimethoxy-3,5-diaminopyridine, 2,3-diamino-6-methoxy-pyridine, 2-methylamino-3-amino-6-methoxy-pyridine, 2-amino-3-hydroxypyridine, 2,6-diaminopyridine and their salts.

[0036] These oxidative dye intermediates may be used either singly or in any combination thereof and are preferably incorporated in a proportion of 0.01 to 5 wt.%, more preferably 0.1 to 4 wt.% based on the whole composition.

[0037] Known acid dye, basic dye, disperse dye and/or reactive dye, which is generally used in oxidative hair color, may be used as direct dye.

[0038] Examples of the acid dyes include Acid Red 27 (C.I. 16185), Acid Red 51 (C.I. 45430), Acid Red 18 (C.I. 16255), Acid Red 92 (C.I. 45410), Acid Red 94 (C.I. 45440), Acid Red 52 (C.I. 45100), Acid Yellow 23 (C.I. 19140), Food Yellow 3 (C.I. 15985), Food Green 3 (C.I. 42053), Food Blue 2 (C.I. 42090), Acid Blue 74 (C.I. 73015), Pigment Red 57-1 (C.I. 15850), Acid Red 33 (C.I. 17200), Acid Red 87 (C.I. 45380), Acid Orange 7 (C.I. 15510), Acid Red 95 (C.I. 45425), Acid Yellow 73 (C.I. 45350), Acid Yellow 3 (C.I. 47005), Acid Green 25 (C.I. 61570), Solvent Green 7 (C.I. 59040), Acid Green 5 (C.I. 42095), Acid Blue 5 (C.I. 42052), Acid Blue 9 (C.I. 42090), Acid Orange 24 (C.I. 20170), Acid Violet 9 (C.I. 45190), Food Red 6 (C.I. 16155), Acid Red 26 (C.I. 16150), Food Red 1 (C.I. 14700), Acid Red 88 (C.I. 15620), Acid Orange 20 (C.I. 14600), Acid Yellow 40 (C.I. 18950), Acid Yellow 1 (C.I. 10316), Acid Yellow 36 (C.I. 13065), Acid Yellow 11 (C.I. 18820), Acid Green 1 (C.I. 10020), Acid Green 3 (C.I. 42085), Acid Violet 43 (C.I. 60730), Acid Black 1 (C.I. 20470), Acid Black 52 (C.I. 15711), Acid Blue 1 (C.I. 42045), Acid Blue 3 (C.I. 42051), Acid Blue 62 (C.I. 62045), Acid Brown 13 (C.I. 10410), Acid Green 50 (C.I. 44090), Acid Orange 3 (C.I. 10385), Acid Orange 6 (C.I. 14270), Acid Red 14 (C.I. 14720), Acid Red 35 (C.I. 18065), Acid Red 73 (C.I. 27290), Acid Red 184 (C.I. 15685), and Brilliant Black 1 (C.I. 28440).

[0039] Examples of the basic dyes include Basic Blue 7 (C.I. 42595), Basic Blue 16 (C.I. 12210), Basic Blue 22 (C.I. 61512), Basic Blue 26 (C.I. 44045), Basic Blue 99 (C.I. 56059), Basic Blue 117, Basic Violet 10 (C.I. 45170), Basic Violet 14 (C.I. 42515), Basic Brown 16 (C.I. 12250), Basic Brown 17 (C.I. 12251), Basic Red 2 (C.I. 50240), Basic Red 12 (C.I. 48070), Basic Red 22 (C.I. 11055), Basic Red 51, Basic Red 76 (C.I. 12245), Basic Red 118 (C.I. 12251:1), Basic Orange 31, Basic Yellow 28 (C.I. 48054), Basic Yellow 57 (C.I. 12719), Basic Yellow 87, Basic Black 2 (C.I. 11825) and Indolenine Yellow (C.I. 48101); basic dye, which is written in Japanese Language Laid-Open Publication (PCT) Nos. Hei 8-507545, 8-501322 or 10-502946, or Japanese Laid-Open Publication No. Hei 10-194942).

[0040] Examples of the other direct dyes include 2-amino-3-nitrophenol, 2-amino-4-nitrophenol, 2-amino-5-nitrophenol

enol, 4-amino-3-nitrophenol, 2-amino-6-chloro-4-nitrophenol, 4-hydroxypropylamino-3-nitrophenol, 3-nitro-p-hydroxyethylaminophenol, 2-nitro-p-phenylenediamine, 4-nitro-o-phenylenediamine, 4-nitro-m-phenylenediamine, 6-nitro-o-toluidine, 6-nitro-p-toluidine, hydroxyethyl-2-nitro-p-toluidine, N,N'-bis(2-hydroxyethyl)-2-nitro-p-phenylenediamine, 2-chloro-5-nitro-N-hydroxyethyl-p-phenylenediamine, 2-nitro-5-glycerylmethylaniline, 3-methylamino-4-nitrophenox-yethanol, N-ethyl-3-nitroPABA, picramic acid, 2-hydroxyethylpicramic acid, 4-nitrophenylaminoethylurea, Solvent Violet 13 (C.I. 60725), Solvent Yellow 44 (C.I. 56200), Disperse Red 17 (C.I. 11210), Disperse Violet 1 (C.I. 61100), Disperse Violet 4 (C.I. 61105), Disperse Blue 3 (C.I. 61505), Disperse Blue 7 (C.I. 62500), HC Blue 2, HC Blue 8, HC Orange 1, HC Orange 2, HC Red 1, HC Red 3, HC Red 7, HC Red 8, HC Red 10, HC Red 11, HC Red 13, HC Red 16, HC Violet 2, HC Yellow 2, HC Yellow 5, HC Yellow 6, HC Yellow 7, HC Yellow 9 and HC Yellow 12.

[0041] These direct dyes may be used either singly or in any combination thereof and are preferably incorporated in a proportion of 0.001 to 5 wt.%, more preferably 0.01 to 4 wt.% based on the whole composition.

[0042] Known autooxidative dye precursor, which is generally used in oxidative hair color, also can be used. Examples of autooxidative dye precursors include 5,6-dihydroxyindole, 5,6-dihydroxyindole-2-carboxylic acid, 5,6-dihydroxyindoline and 5,6-dihydroxyindoline-2-carboxylic acid; precursors of (pseudo-)trichochrome, (pseudo-)phaeomelanin or like pigment, which are written in Japanese Laid-Open Publication Nos. Hei 7-252118, 7-252120, 7-252121 or 6-183936.

[0043] These autooxidative dye precursors may be used either singly or in any combination thereof and are preferably incorporated in a proportion of 0.01 to 5 wt.%, more preferably 0.1 to 4 wt.% based on the whole composition. The hair dye composition of the present invention preferably has a pH value of 2 to 12, more preferably 5 to 12, particularly preferably 7.5 to 12.

[0044] The hair dye composition of the present invention may have one or more than one pH-adjusting agent(s), which are generally used as ingredients for cosmetics. Examples of pH-adjusting agents include hydrochloric acid, phosphoric acid, citric acid, glycolic acid, lactic acid, ammonia, ammonium hydrate, monoethanolamine, isopropanolamine, 2-amino-2-methylpropanol, ammonium carbonate, ammonium bicarbonate, sodium carbonate, sodium bicarbonate, potassium carbonate, potassium bicarbonate, guanidine carbonate, ammonium chloride, monoethanolamin hydrochloric acid salt, sodium hydrogenphosphate, potassium phosphate, sodium hydroxide and potassium hydroxide.

[0045] The hair dye composition of the present invention may have water and/or organic solvents as medium. Examples of organic solvents include ethanol, 2-propanol, benzyl alcohol, 2-benzyloxyethanol, propyleneglycol, 1,3-butanediol, diethyleneglycol, glycerol, 2-ethoxyethanol, 2-butoxyethanol, 2-(2-ethoxy)ethoxyethanol and 2-(2-butoxy)ethoxyethanol.

[0046] Besides the above components, components commonly used in the classical cosmetic compositions and the like, for example, surfactants, cationic polymer, oily substances, silicone derivatives, thickener, perfume bases, preservatives, ultraviolet absorbents, chelating agents, antioxidants, germicides, propellants, etc, may further be incorporated into the hair dye composition according to the present invention so as to no detrimental influence is thereby imposed on the effects of the present invention.

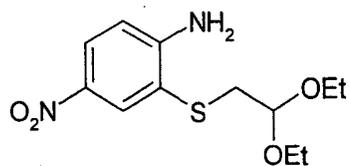
[0047] The hair dye composition of the present invention can be prepared in a conventional manner into a one-part composition, a two-part composition having a first-part component containing the compound represented by formulas (1) or (2) or a salt thereof and a second-part component containing an oxidizing agent or a three-part composition having, in addition to these two components, a powdery oxidizing agent such as persulfate. The one-part type is applied to the hair directly and then left in air for 1 to 60 minutes. In order to achieve a good hair-dyeing ability of the one-part type composition, it is preferable to add acidic substance after applying the above-described one-part type composition having pH value of 7.5 to 12, adjusting pH of the composition from 0.5 to 4. After leaving the hair in air, good coloration will result. On the other hand, the two- or three-part type is applied to the hair for 1 to 60 minutes after mixing the components upon hair dyeing.

[0048] The hair dye composition of the present invention may be preferably provided in the form of, for example, powder, cream, emulsion, gel, paste, aerosol, aerosol-foam, solution, etc.

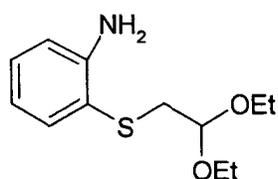
EXAMPLES

[0049] The following non-limiting examples are given by way of illustration only.

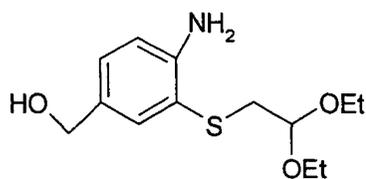
[0050] The compounds, which were used for evaluations, were represented by formulas (1-a) to (1-d) and formula (2-a) below:



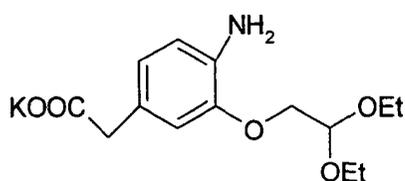
(1-a)



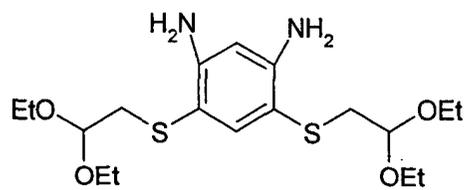
(1-b)



(1-c)



(1-d)



(2-a)

Example 1

[0051] 10 mg of compound (1-a) was dissolved in 20 wt.% ethanol in water (10g) at pH 10. An untreated white goat tress was immersed in the resulting solution for 15 minutes at 50°C. Then, the solution was adjusted to pH 1 with HCl (aq) before the tress was removed and left in air to develop color for 5 minutes to produce a bright, vivid yellow coloration. Then, the tress was rinsed and dried.

[0052] The color of hair before treatment: L=85 a=-0.3 b=12.5

[0053] The color of hair after treatment: L=78 a=-2.8 b=58.4

Example 2

[0054] Hair dye compositions for dyeing the hair having their corresponding compositions shown in Table 1 are prepared to evaluate them as to hair-dyeing ability, fastness to shampooing and resulting color of hair.

Table 1

Component	Invention Product (% by weight)				
	1	2	3	4	5
Compound (1-b)	1	-	-	-	-
Compound (1-c)	-	2	-	-	2
Compound (1-d)	-	-	2	-	-
Compound (2-a)	-	-	-	2.5	-
Red Color No.227	-	-	-	-	0.1
Ethanol	10	5	5	10	5
Propyleneglycol	10	-	-	10	-

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Table 1 (continued)

Component	Invention Product (% by weight)				
	1	2	3	4	5
Citric acid	-	-	-	3	3
Lactic acid	3	3	3	-	-
48% NaOH aqueous solution	Adjusted to pH 3.5				
Hydroxyethyl cellulose	1	1	1	-	-
Xanthan gum	-	-	-	1	1
Purified Water	Balance	Balance	Balance	Balance	Balance

[0055] Each hair dye composition is applied to white tresses of goat hair (1g), and the tresses are then left to stand for 30 minutes at 30°C. Thereafter, the tresses are washed with water, shampooed once and dried.

[0056] The tresses are then shampooed 10 times and dried.

[0057] As a result, all compositions can provide excellent hair-dyeing ability and good fastness to shampooing, and can provide suitable natural-looking color ranging from yellow to red to goat hair.

Example 3

[0058] Compositions having their corresponding compositions shown in Table 2 are prepared.

Table 2

Component	Invention Product (% by weight)				
	6	7	8	9	10
Compound (1-b)	2	-	-	-	-
Compound (1-c)	-	4	-	-	4
Compound (1-d)	-	-	4	-	-
Compound (2-a)	-	-	-	5	-
Red Color No.227	-	-	-	-	0.2
Ethanol	20	10	10	20	10
Propyleneglycol	20	-	-	20	-
Citric acid	-	-	-	0.5	0.5
Lactic acid	0.5	0.5	0.5	-	-
48% NaOH aqueous solution	Adjusted to pH 5.5				
Hydroxyethyl cellulose	2	2	2	-	-
Xanthan gum	-	-	-	2	2
Purified Water	Balance	Balance	Balance	Balance	Balance

[0059] Each composition is mixed with the same weight of a 10% aqueous solution of sodium periodate to thereby give a hair dye composition.

[0060] Each hair dye composition is applied to white tresses of goat hair (1g), and the tresses are then left to stand for 30 minutes at 30°C. Thereafter, the tresses are washed with water, shampooed once and dried.

[0061] The tresses are then shampooed 10 times and dried.

[0062] As a result, all compositions can provide excellent hair-dyeing ability and good fastness to shampooing, and could provide suitable natural-looking color ranging from yellow to red to goat hair.

Example 4

[0063] Compositions having their corresponding compositions shown in Table 3 are prepared.

Table 3

Component	Invention Product (% by weight)				
	11	12	13	14	15
Compound (1-b)	2	-	-	-	-
Compound (1-c)	-	4	-	-	4
Compound (1-d)	-	-	4	-	-
Compound (2-a)	-	-	-	5	-
p-Phenylenediamine	-	-	-	-	0.2
5-Amino-2-methylphenol	-	-	-	-	0.3
Oleic acid	10	10	10	10	10
Diethanolamide oleate	8	8	8	8	8
Oleyl alcohol	2	2	2	2	2
Polyoxyethylene octadodecyl ether (20EO)	10	10	10	10	10
25% Ammonia	Adjusted to pH 9.5				
Ethanol	15	15	15	15	15
Propylene glycol	10	10	10	10	10
Ammonium chloride	3	3	3	3	3
Purified water	Balance	Balance	Balance	Balance	Balance

[0064] Each composition is mixed with the same weight of a 6 wt.% aqueous solution of hydrogen peroxide to thereby give a hair dye composition.

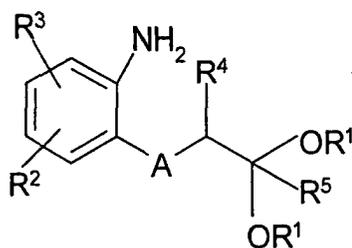
[0065] Each hair dye composition is applied to white tresses of goat hair (1g), and the tresses are then left to stand for 30 minutes at 30°C. Thereafter, the tresses are washed with water, shampooed once and dried.

[0066] The tresses are then shampooed 10 times and dried.

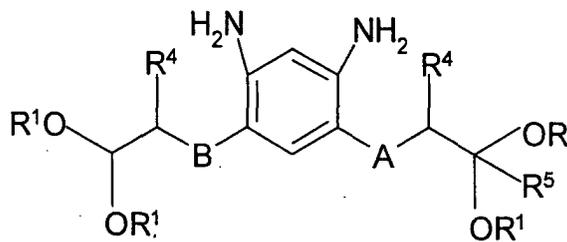
[0067] As a result, all compositions can provide excellent hair-dyeing ability and good fastness to shampooing, and can provide suitable color ranging from yellow to red to goat hair.

Claims

1. A hair dye composition comprising a 1-(o-aminophenylthio)-2,2-dialkoxyalkane derivative or a 1-(o-aminophenoxy)-2,2-dialkoxyalkane derivative represented by formulas (1) or (2) below or a salt thereof:



(1)



(2)

wherein each of A and B independently represents sulfur or oxygen atom; R¹ represents a C₁₋₆ alkyl group which may be substituted; each of R² and R³ independently represents a hydrogen atom, a C₁₋₆ alkyl group which may be substituted, a C₁₋₆ acyl group, a C₁₋₆ alkoxy group, a hydroxy group, an amino group which may have one or two alkyl group(s), a nitro group, a C₂₋₇ alkoxy carbonyl group, a carboxy group or a carboxylate anion group having ammonium or alkali metal cation as counter ion; R⁴ represents a hydrogen atom, a hydroxy group or a C₁₋₆ alkoxy group; R⁵ represents a hydrogen atom, a C₂₋₇ alkoxy carbonyl group or a phenyl group which may be substituted.

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2. The hair dye composition according to Claim 1, which further comprises one or more than one oxidizing agent(s).
3. The hair dye composition according to Claim 1 or 2, which further comprises one or more than one oxidative dye intermediate(s), one or more than one direct dye(s) and/or one or more than one autooxidative dye precursor(s).
4. A method of dyeing the hair by applying a proper amount of the hair dye composition of Claim 1, 2 or 3 to the hair.
5. A method of dyeing hair comprising treatment of the hair by applying a proper amount of the hair dye composition described in Claim 1, having pH value of 7.5 to 12, applying acidic substance to the hair, and then leaving the hair in air for autooxidation.
6. Use of the composition as defined in any one of the claims 1 to 3, for dyeing hair and for imparting the hair with a vivid and/or natural-looking colour.

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European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 02 01 0153

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MUNICH		14 November 2002	Romano-Götsch, R
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